



Vietnam Academy of Science and Technology

Vietnam Journal of Marine Science and Technology

journal homepage: vjs.ac.vn/index.php/jmst



Species composition and distribution of mollusca on dead coral from Central to North Vietnam

Hua Thai Tuyen*, Phan Thi Kim Hong, Nguyen An Khang, Mai Xuan Dat, Nguyen Trung Hieu, Nguyen Ngoc Anh Thu

Institute of Oceanography, VAST, Vietnam

Received: 20 September 2022; Accepted: 2 December 2022

ABSTRACT

A study on Mollusks' species composition and distribution on dead coral from Quang Ngai to Cat Ba was conducted during the field survey between Vietnam and Russia on the AKADEMIC OPARIN RC vessel in 2021 at 39 reef stations in 14 study areas. By comparative morphology method, the authors have identified 135 taxa of Mollusca belonging to 48 families, 4 classes on coral reefs. The species composition of Mollusca was slightly different between study areas.

Keywords: Mollusca, coral reef, OPARIN.

*Corresponding author at: Institute of Oceanography, 01 Cau Da St., Nha Trang city 650000, Khanh Hoa, Vietnam.
E-mail addresses: huathaituyen@gmail.com

<https://doi.org/10.15625/1859-3097/17523>

ISSN 1859-3097; e-ISSN 2815-5904/© 2023 Vietnam Academy of Science and Technology (VAST)

INTRODUCTION

Coral reefs are habitats for many groups of species, such as sponges, corals, reef fish, and thousands of species of worms, crustaceans, mollusks, echinoderms, turtles, and snakes. Coral reefs have the highest diversity of species composition compared to ecosystems of seagrass beds, mangroves, intertidal flats, and soft bottoms. The sea of Vietnam has about 1,222 km² of coral reefs distributed mainly around inshore and offshore islands [1]. Interdisciplinary studies of coral reef biodiversity have recorded 454 reef-building coral species [2], 227 mollusk species [3], 376 seaweed species [4], 616 reef fish species, 46 species of crustaceans, 64 species of echinoderms, 38 species of polychaetes [5]. Mollusks are a

group of organisms commonly found on coral reefs and are valuable in terms of food and handicrafts to serve the needs of tourists in coastal localities. The studies on mollusks mainly focus on species distributed in the reef, and there is no study on mollusks living in dead corals. Therefore, the research on mollusks living in dead corals has been conducted by the Vietnam Academy of Science and Technology (VAST) and Russian on the AKADEMIC OPARIN RC vessel in 2021 to provide scientific data on the diversity of mollusk species composition as a basis for further studies.

METHODOLOGY

Survey sites

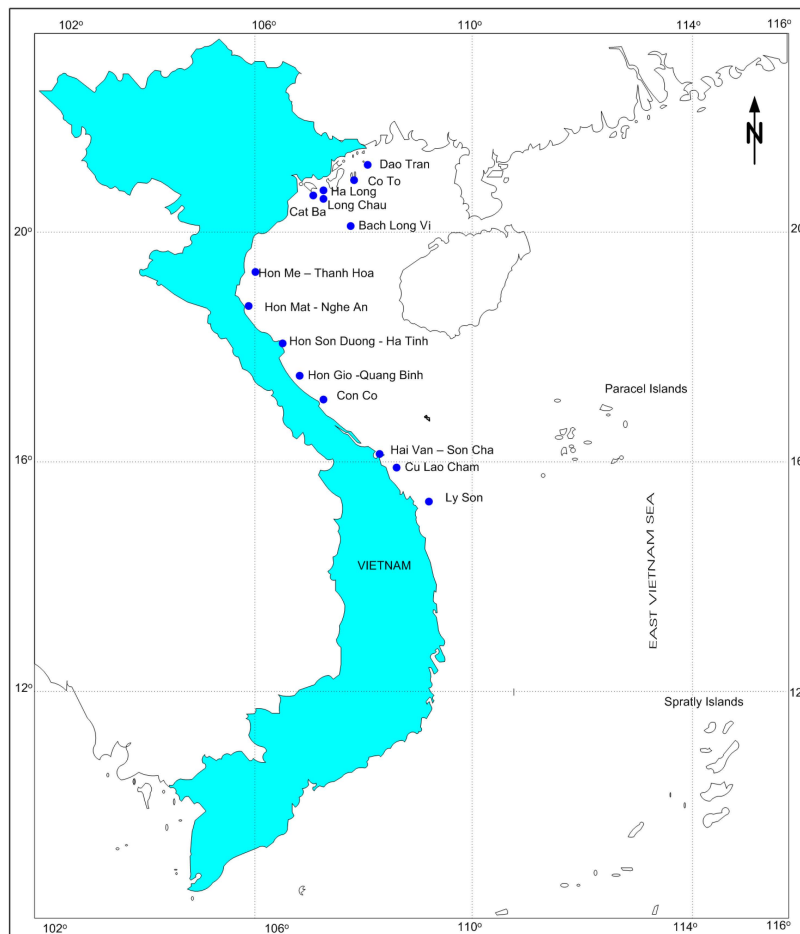


Figure 1. Localities of collected materials in coastal waters of Vietnam

Table 1. Coordinates of study sites

No.	Regions	Survey point	Coordinates	Depth	Numbers of samples
1	Cat Ba	Cat Dua	20.72912°-107.07981°	3–4 m	1
2		Ba Trai Dao	20.79199°-107.09895°	5–6 m	1
3	Ha Long	Bai Dong	20.77607°-107.18259°	3 m	2
4		Ha Long 1	20.77972°-107.17281°	5–8 m	2
5	Long Chau	Long Chau	20.62602°-107.15858°	5–6 m	2
6	Co To	Co To Con	21.05150°-107.77650°	7–8 m	1
7		Thanh Mai	21.03810°-107.82365°	4 m	2
8		Thanh Lan	21.02415°-107.81980°	6 m	2
9		Mam Xoi	21.03313°-107.79440°	5–8 m	2
10	Dao Tran	Dao Tran 2	21.24972°-107.97194°	7 m	1
11		Dao Tran 1	21.24189°-107.95122°	6 m	2
12	Bach Long Vi	Bach Long Vi 1	20.14741°-107.73177°	8–10m	2
13		Bach Long Vi 2	20.13674°-107.72263°	5–8 m	2
14		Bach Long Vi 3	20.14510°-107.73129°	10 m	2
15	Hon Me - Thanh Hoa	Hon Me	19.38052°-105.91419°	8–13 m	2
16		Hon Bat	19.36713°-105.91146°	6–8 m	2
17		Hon Me 2	19.36715°-105.91802°	8 m	2
18		Hon Mieng	19.34733°-105.90075°	6–8 m	2
19	Hon Mat - Nghe An	Hon Mat	18.79615°-105.95695°	4–13 m	2
20		Hon Con Ca	18.79615°-105.95695°	4–12 m	2
21	Hon Son Duong - Ha Tinh	Son Duong	18.09938°-106.46539°	6–11 m	2
22	Hon Gio - Quang Binh	Nhon Trach	17.54553°-106.60096°	11 m	2
23		Cua Roon	17.87079°-106.48537°	7 m	2
24		Hon Gio 1	17.91201°-106.67337°	6–15 m	2
25		Hon Gio 2	17.91121°-106.67088°	4–13 m	2
26	Con Co	Con Co 1	17.16059°-107.33080°	6–8 m	2
27		Con Co 2	17.16601°-107.33353°	6 m	2
28		Còn Cò 3	17.16680°-107.33902°	5–9 m	2
29		Còn Cò 4	17.15245°-107.34443°	4 m	2
30	Hai Van - Son Cha	Sung Rong Cau	16.21434°-108.18128°	5–6 m	2
31		Hon son Cha	16.21740°-108.19908°	4–5 m	2
32		Bai Chuoi	16.21706°-108.14351°	6 m	2
33		Bai Ca	16.21401°-108.11918°	8 m	2
34	Cu Lao Cham	Hon Tai	15.90311°-108.53970°	5–9 m	2
35		Bai Huong	15.92451°-108.53197°	6 m	2
36		Hon Mo	15.93367°-108.47440°	5–11 m	2
37		Hon Giai	15.94565°-108.47782°	7–12 m	2
38	Ly Son	Ly Son 1	15.39679°-109.11111°	7 m	2
39		Ly Son 2	15.39168°-109.09906°	4–5 m	2

The study was carried out during the survey in May 2021 at 39 coral reef stations of 14 reef areas including Cat Ba, Ha Long, Long Chau, Co To, Tran Dao, Bach Long Vi, Hon Me - Thanh Hoa, Hon Mat - Nghe An, Hon Son Duong- Ha Tinh, Hon Gio - Quang Binh, Con Co, Hai Van - Son Cha, Co Lao Cham, and Ly Son (Figure 1 and Table 1).

Sample collection

Experts collected benthic samples in dead corals by collecting 1 dead coral sample/zone at each cross-section using a 1/10 m² square frame. They placed the frames at random locations in the reef, then collected all the dead corals in the frames and put each frame in a separate bag and brought it on board. The dead coral blocks were broken and all the organisms in the frame were collected and fixed to bring them to the laboratory.

The classification of mollusks is based on the taxonomic documents of [6–13]. The list of species composition was reviewed and revised according to WORMS [14]. Biome group analysis is based on Bray-Curtis similarity matrix with species composition data at study stations. Cluster analysis was used to evaluate

the similarity in species composition between survey stations at the similarity level of 20% and 40%. All analyzes were performed in PRIMER 6.0 software [15].

RESULTS AND DISCUSSION

Species composition

Analysis results have recorded 135 taxa belonging to 48 families and 4 classes of Mollusks (Table 2). Although the number of recorded species is relatively small, the structure of species composition of these four groups of animals is quite diverse at taxonomic levels. 52.94% of the recorded mollusks belong to the gastropod class, 45.59% of the bivalve species, the octopod, polyplacophore, and cephalopodan account for less than 1%. The gastropod class has 72 taxa belonging to 57 genera and 27 families; the bivalve class has a total of 61 taxa belonging to 44 genera and 20 families (Table 2). Of the 49 families of mollusks, the families with the highest number of species are Muricidae (15 taxa) and Mytilidae (13 taxa). The remaining families have small recorded species.

Table 2. Statistical table of the number of Mollusca taxa recorded during the survey

Class	Families	Genera	Taxa	Rate (%)
Bivalvia	20	44	61	45.59
Gastropoda	27	57	72	52.94
Octopoda	1	1	1	0.74
Polyplacophora	1	1	1	0.74
Total	49	103	135	100

Distribution characteristics of mollusk species composition

Statistics showed that Hon Son Duong station (Ha Tinh province) has the highest number of species (26 taxa), followed by Long Chau and Hon Mieng stations with 23 taxa. Stations of Ly Son 2, Con Co 1, and Con Co 3 have the most minor species (5 taxa). The number of mollusks among survey reef stations ranged from 17–45 taxa (an average of 29 taxa/area), with Co To having the highest number of species (45 taxa), Hon Me (44 taxa)

and the lowest at Ly Son (17 taxa) (Figure 2). The Mytilidae family appeared at all survey stations (39/39 stations), followed by Arcidae (34/39 stations, and Gastrochaenidae (31/39 stations). *Gastrochaena malaccana* and *G. cuneiformis* species had a high frequency of occurrence (37/39 and 31/39 survey stations).

Thirty-three species have been found attached by their byssal threads to many dead corals, and 84 species have another lifestyle (Table 3). Of the total species composition above, there are 18 coral-boring species, representing 3 families Arcidae (3 taxa),

Gastrochaenidae (6 taxa), and Mytilidae (9 taxa). Compared with the results of Valentich-Scott and Tongkerd [16] when studying the coral-boring bivalves mollusks in southeastern Thailand, the species composition in this survey

is smaller (18 species compared to 21 species). This difference may be because in this study, only subtidal samples were collected, while in Thailand, both tidal and intertidal areas were sampled, so the species composition was higher.

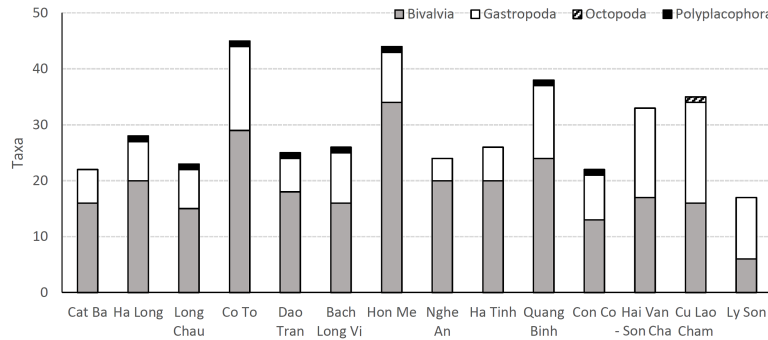


Figure 2. Number species of Mollusks in the survey areas

Table 3: Statistical table of the number of Mollusca taxa by lifestyle

Class	Byssal threads	Coral-boring	Others
Bivalvia	33	18	10
Gastropoda	0	0	72
Octopoda	0	0	1
Polyplacophora	0	0	1
Total	33	18	84

The density of mollusks was highest in Hon Me - Thanh Hoa area (512.5 individuals/1 m²) and lowest in Ly Son area (77.5 individuals/m²) (Figure 3). The density of Mollusks tends to decrease in the direction from north to south.

In total, the density of the bivalve group predominates, followed by gastropods, and the lowest density was cephalopods; they occurred only in Cu Lao Cham with very low density.

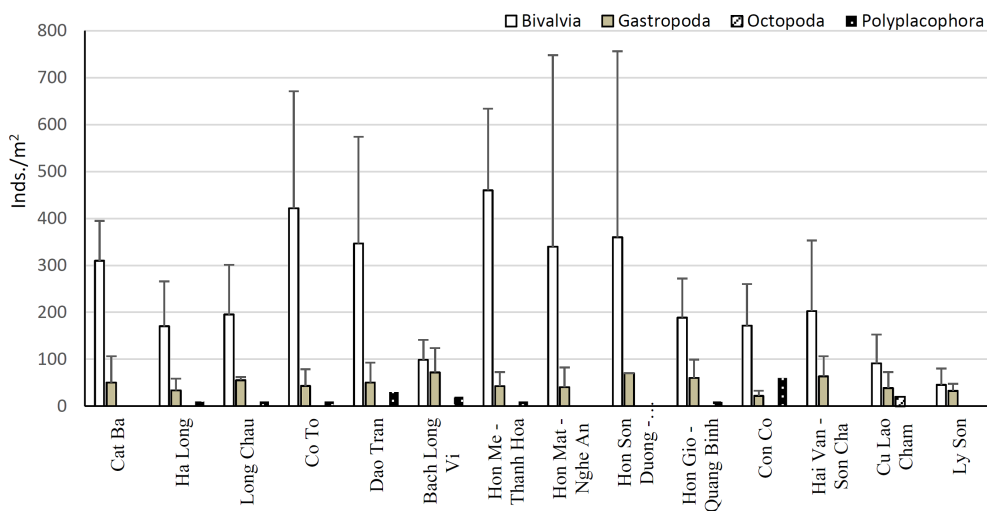


Figure 3. Mollusk densities (inds./100 m²) in study areas

Analysis of species composition by each station showed that the similarity between the survey stations was very low (about 20%) (Figure 4). The group analysis results with the similarity of mollusk species composition between the study stations are about 20% similar between the survey stations except for Hon Tai - Cu Lao Cham and Ly Son 2 stations. Between the study areas mollusks

have similar subspecies, and the mollusk fauna can be divided into 2 groups according to the geographical location from North to South, including (Group 1) Cat Ba to Cu Lao Cham and (Group 2) is the Ly Son area (Figure 5). This result is also consistent with the results of Thai Minh Quang et al., [17] when studying mollusks on coral reefs in 2016–2017.

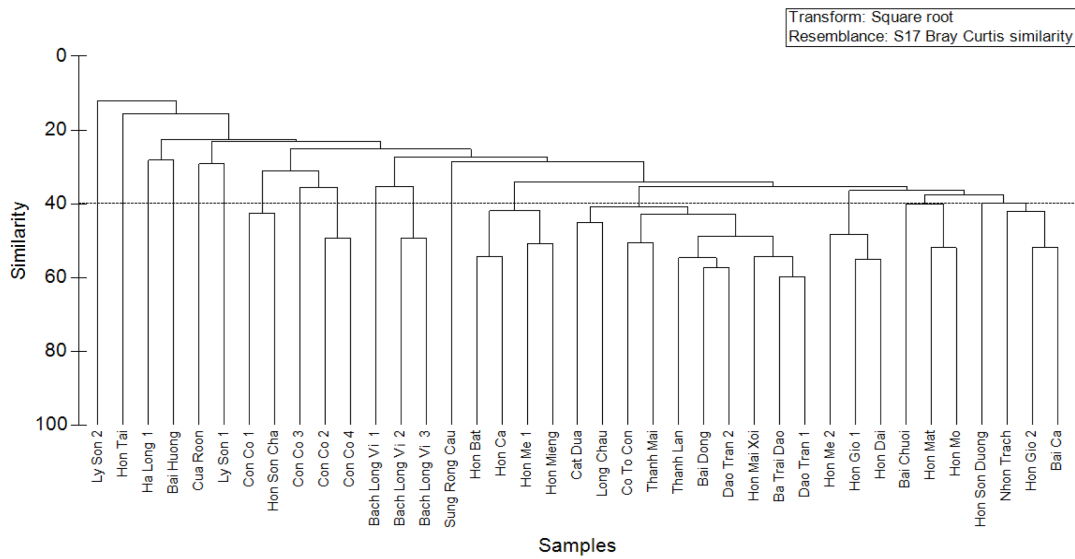


Figure 4. Cluster analysis chart of Mollusk species composition between studied reef stations

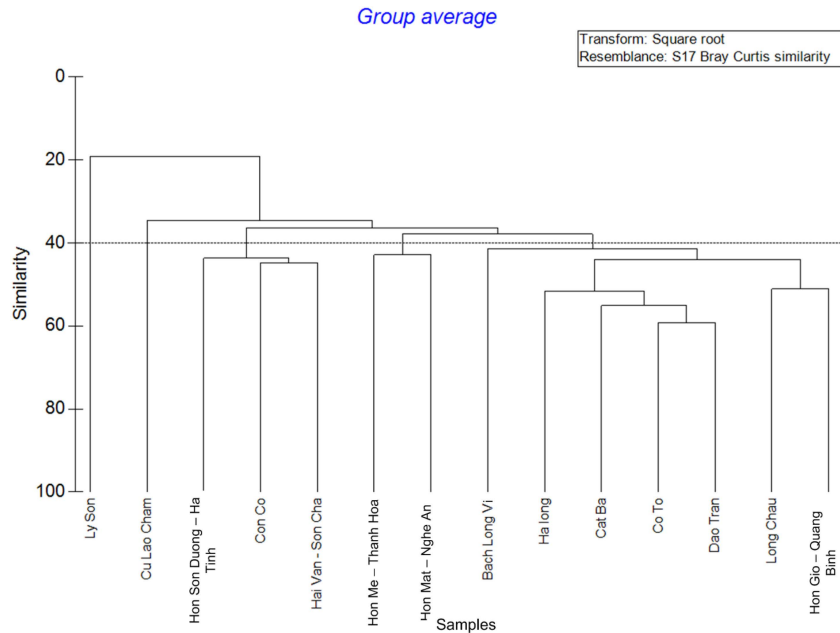


Figure 5. Cluster analysis chart of Mollusk species composition between studied reef areas

CONCLUSION

Research has recorded and published lists of 136 species of mollusks belonging to 48 families, four classes. Among them are 18 coral-boring species, 33 byssal threads species, and 84 free-living species on the substrates. Mollusks density tends to decrease from North to South. Mollusks can be divided into two groups according to the geographical location from North to South: (Group 1) Con Co to Cu Lao Cham and (Group 2) from Ly Son.

Acknowledgments: The research was funded by the project “Investigating biodiversity of offshore benthic communities and toxicity of Zoanthid corals and related microalgae”, code QTRU02.09/21–22.

REFERENCES

- [1] Tuan, V. S., Yet, N. H., and Long, N. V., 2005. Coral reefs in Vietnam. *Science and Technics Publishing House, Ho Chi Minh city*, 212 p. (in Vietnamese).
- [2] Tuan, V. S., 2014. Fauna of reef corals in the Vietnam marine area. *Proceedings of national conference on marine biology and sustainable development in Vietnam. Publishing House of Science and Technology*. pp. 315–322. (in Vietnamese).
- [3] Do, T. A., Do, V. K., and Do, A. D., 2014. The species composition, distribution, biomass of Mollusk (Class: Gastropoda, Bivalvia, Cephalopoda) in coral reef in 19 surveyed islands in Vietnam. *Vietnam Journal of Marine Science and Technology*, 14(4), 358–367. doi: 10.15625/1859-3097/14/4/5822. (in Vietnamese).
- [4] Duy, D. A., and Khuong, D. V., 2013. The status of species diversity of seaweeds in surveyed islands in Vietnam sea. *Vietnam Journal of Marine Science and Technology*, 13(2), 105–115. (in Vietnamese).
- [5] Khuong, D. V., Duy, D. V., Dung, L. D., An, D. T., Hieu, N. V., Dat, D. T., Huong, T. V., Dong, N. Q., Tuan, T. V., Thung, D. C., Quan, N. V., and The, N. D., 2014. The species composition of seacreatures in coral reef areas surrounding 19 surveyed islands in Vietnam. *Proceedings of national conference on marine biology and sustainable development in Vietnam. Publishing House of Science and Technology*. pp. 117–129. (in Vietnamese).
- [6] Abbott, R. T., 1991. Seashells of southeast Asia. *Graham Brash*.
- [7] Abbott, R. T., and Dance, S. P., 1986. Compendium of Shells: a full-color guide to more than 4200 of the world’s marine shells. American Malacologist. Inc., Melbourne, Fl and Burlington, MA.
- [8] Dance, S. P., 1977. Das grobe Bush der Meeresmuscheln: Schnecken u. Muscheln d. Weltmeere. Verlag Eugen Ulmer Stuttgart.
- [9] Cernohorsky, W. O., 1967. Marine shells of the Pacific (Vol. 2). *Pacific publications*.
- [10] Morris, P. A., and Clench, W. J., 1975. A field guide to shells: of the Atlantic and Gulf Coast and the West Indies (No. QL 416. M67 1975).
- [11] Turner, R. D., and Boss, K. J., 1962. The genus Lithophaga in the western Atlantic. *Department of Mollusks, Museum of Comparative Zoölogy, Harvard University*.
- [12] Wye, K. R., 1991. The encyclopedia of shells. Facts on File. *New York. Oxford*.
- [13] Hylleberg, J., and Kilburn, R., 2003. Marine molluscs of Vietnam. Marine molluscs of Vietnam. *Phuket Marine Biological Center, Special Publication*, 28, 1–300.
- [14] World Register of Marine Species (WORMS), 2018. <http://www.marine-species.org>, accessed June 30, 2022 (in Vietnamese).

- [15] Clarke, K. R., and Gorley, R. N., 2006. PRIMER v6: PRIMER-E Ltd, Plymouth, England.
- [16] Valentich-Scott, P., and Tongkerd, P., 2008. Coral-boring bivalve molluscs of southeastern Thailand, with the description of a new species. *Raffles Bulletin of Zoology*, 18, 191–216.
- [17] Quang, T. M., Tuyen, H. T., and Khang, N. A., 2018. Species composition and distribution of mollusca and echinodermata on coral reefs in survey on Akademik Oparin RC in 2016–2017. *Vietnam Journal of Marine Science and Technology*, 18(4A), 81–92. <https://doi.org/10.15625/1859-3097/18/4A/13639>. (in Vietnamese).

Appendix. List of molluscs in the survey areas

Taxa	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Bivalvia														
Anomidae														
<i>Anomia</i> sp.							+		+					
Arcidae														
<i>Acar congenita</i> (E. A. Smith, 1885)				+							+	+		
<i>Acar</i> sp.							+							
<i>Acra</i> spp.	+	+	+	+	+	+	+		+	+	+	+	+	+
<i>Arca</i> cf. <i>plicata</i> Chemnitz, 1795			+		+			+		+				
<i>Barbatia</i> cf. <i>amygdalumtostum</i> (Röding, 1798)			+											
<i>Barbatia foliata</i> (Forsskål in Niebuhr, 1775)	+	+	+	+			+	+		+	+			+
<i>Barbatia</i> spp.								+	+					
<i>Lamarcka</i> cf. <i>avellana</i> (Lamarck, 1819)	+	+		+	+	+	+							
<i>Lamarcka ventricosa</i> (Lamarck, 1818)		+	+	+	+		+	+				+	+	
Biv. others														
Biv. others	+	+		+	+	+	+	+	+	+		+	+	+
Carditidae														
<i>Cardita</i> cf. <i>leana</i> Dunker, 1860				+										
<i>Cardita variegata</i> Bruguière, 1792		+	+	+	+	+	+			+	+	+		
Corbulidae														
<i>Corbicula</i> sp.									+					+
Cuspidariidae														
<i>Cuspidaria</i> sp.							+							
Chamidae														
<i>Chama</i> cf. <i>pacifica</i> Broderip, 1835	+													
<i>Chama</i> sp.		+	+	+	+		+			+				
Gastrochaenidae														
<i>Cucurbitula cymbium</i> (Spengler, 1783)				+	+		+	+				+		
<i>Gastrochaena cuneiformis</i> Spengler, 1783	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Gastrochaena</i> sp.									+	+		+		
<i>Jouannetia</i> sp.							+							+
<i>Parapholas quadrizonata</i> (Spengler, 1792)						+	+							
<i>Penitella</i> sp.												+		

Taxa	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Isogomonidae														
<i>Isogomon ephippium</i> (Linnaeus, 1758)							+							
<i>Isogomon legumen</i> (Gmelin, 1791)							+		+		+	+		
<i>Isogomon perna</i> (Linnaeus, 1767)	+		+	+	+	+	+		+	+	+	+	+	
Limidae														
<i>Lima lima</i> (Linnaeus, 1758)			+				+	+						+
Malleidae														
<i>Malleus</i> spp.							+	+	+					+
Mytilidae														
<i>Botula cinnamomea</i> (Gmelin, 1791)	+	+		+	+	+	+	+		+		+		
<i>Botula</i> sp.		+					+	+						
<i>Gregariella coralliophaga</i> (Gmelin, 1791)	+	+	+	+	+				+	+				
<i>Leiosolenus</i> cf. <i>lima</i> (Jousseume in Lamy, 1919)				+			+		+		+			
<i>Lithophaga</i> cf. <i>curta</i> (Linnaeus, 1758)							+			+	+			+
<i>Lithophaga malaccana</i> (Reeve, 1857)	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Lithophaga</i> sp.				+			+		+	+				
<i>Lithophaga teres</i> (Philippi, 1846)	+	+	+	+	+	+	+	+	+	+		+		
<i>Lithophaga zitteliana</i> Dunker, 1882				+			+	+						
<i>Modiolus</i> spp.	+	+		+	+		+	+	+	+	+	+	+	
<i>Musculus</i> sp.		+						+						
<i>Perna viridis</i> (Linnaeus, 1758)									+					
<i>Septifer bilocularis</i> (Linnaeus, 1758)			+	+		+	+			+				+
Nuculanidae														
<i>Nuculana</i> sp.							+							
Ostreidae														
<i>Lopha cristagalli</i> (Linnaeus, 1758)										+				
<i>Lopha</i> sp.										+				
<i>Ostrea</i> sp.	+	+		+			+	+	+		+	+		+
Pectinidae														
<i>Chlamys</i> sp.				+	+				+					
<i>Laevichlamys</i> cf. <i>cuneata</i> (Reeve, 1853)				+										
Pinnidae														
<i>Pinna</i> cf. <i>muricata</i> Linnaeus, 1758								+		+				
<i>Streptopinna saccata</i> (Linnaeus, 1758)											+			
Pteriidae														
<i>Pinctada margaritifera</i> (Linnaeus, 1758)		+												
<i>Pteria</i> spp.	+			+		+	+			+				+
Spondylidae														
<i>Spondylus barbatus</i> Reeve, 1856		+												
Trapezidae														
<i>Coralliophaga coralliophaga</i> (Gmelin, 1791)	+				+			+	+					+
<i>Coralliophaga</i> sp.		+	+	+		+			+	+				

Taxa	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Veneridae														
<i>Dosinia</i> sp.				+										
<i>Gafrarium</i> sp.								+						
<i>Irus ishibashianus</i> Kuroda & Habe, 1952							+							
<i>Irus macrophylla</i> (Deshayes, 1853)	+	+		+	+	+	+			+			+	
<i>Irus</i> sp.							+					+		
<i>Lioconcha castrensis</i> (Linnaeus, 1758)													+	
<i>Trapezium</i> cf. <i>bicarinatum</i> (Linnaeus, 1758)										+				
Gastropoda														
Cerithiidae														
<i>Cerithium coralium</i> Kiener, 1841		+										+		
<i>Cerithium</i> spp.				+				+					+	
<i>Rhinoclavis sinensis</i> (Gmelin, 1791)	+													
Cerithiopsidae														
<i>Seila (Notoseila)</i> cf. <i>morishimai</i> (Habe, 1970)										+				
Columbellidae														
<i>Euplica scripta</i> (Lamarck, 1822)	+		+	+	+	+			+		+		+	
<i>Euplica varians</i> (G. B. Sowerby I, 1832)							+							
<i>Zafra troglodytes</i> (Souverbie in Souverbie & Montrouzier, 1866)							+	+	+	+	+	+	+	
Conidae														
<i>Conus flavidus</i> Lamarck, 1810														+
<i>Conus musicus</i> Hwass in Bruguière, 1792														+
<i>Conus</i> sp.							+							
Costellariidae														
<i>Costellaria</i> sp.												+		
<i>Thala</i> sp.													+	
Cymatidae														
<i>Monoplex pilearis</i> (Linnaeus, 1758)								+		+			+	
Cypraeidae														
<i>Cypraea</i> sp.														+
<i>Erronea cylindrica</i> (Born, 1778)							+							
<i>Mauritia arabica</i> (Linnaeus, 1758)										+				+
<i>Phenacovolva rosea</i> (A. Adams, 1855)													+	
Dialidae														
<i>Diala albo</i> (R. B. Watson, 1886)												+	+	
Eulimidae														
Eulimidae others									+					
Fascioliariidae														
<i>Peristernia reincarnata</i> Snyder, 2000												+		
<i>Turriturris turritus</i> (Gmelin, 1791)												+	+	
Fissurellidae														

Taxa	1	2	3	4	5	6	7	8	9	10	11	12	13	14
<i>Diodora</i> sp.		+		+	+									
<i>Emarginella eximia</i> (A. Adams, 1852)														+
<i>Hemimarginula</i> cf. <i>biangulata</i> (G. B. Sowerby III, 1901)														+
Gas. others														
Gas. others		+			+		+			+	+		+	+
Haliotidae														
<i>Haliotis ovina</i> Gmelin, 1791				+						+				
Mitridae														
<i>Nebularia ferruginea</i> (Lamarck, 1811)														+
<i>Tabellaria</i> cf. <i>silicula</i> Ehrenberg, 1856								+						
Muricidae														
<i>Cytharomorula vexillum</i> Kuroda, 1953								+						
<i>Chicoreus brunneus</i> (Link, 1807)								+						+
<i>Drupella margariticola</i> (Broderip, 1833)								+						
<i>Drupella</i> spp.	+													
<i>Habromorula spinosa</i> Kiener, 1841													+	
<i>Maculotriton serriale</i> (Deshayes, 1833)				+										+
<i>Magilus antiquus</i> Montfort, 1810											+			
<i>Mancinella echinata</i> (Blainville, 1832)					+	+								
<i>Mancinella</i> spp.				+										
<i>Marchia triptera</i> (Born, 1778)									+					
<i>Morula spinosa</i> (H. Adams & A. Adams, 1853)													+	
<i>Morula</i> spp.	+	+	+	+	+		+	+	+	+	+	+	+	+
<i>Nucella emarginata</i> (Deshayes, 1839)													+	
<i>Pascula ochrostoma</i> (Blainville, 1832)													+	
<i>Thais</i> sp.										+				
Nassariidae														
<i>Nassarius</i> sp.										+			+	
Naticidae														
<i>Sinum</i> spp.									+	+				
Nudibranchia														
Nudibranchia others			+							+				+
Ovulidae														
<i>Aclyvolva coarctata</i> (G. B. Sowerby II, 1848)														+
Pyramidellidae														
Pyramidellidae others												+	+	
Retusidae														
<i>Retusa longispirata</i> (Yamakawa, 1911)														+
Rissoidae														
<i>Alvania ogasawarana</i> (Pilsbry, 1904)				+					+	+		+		
Rissoidae others										+				
Strombiidae														

Taxa	1	2	3	4	5	6	7	8	9	10	11	12	13	14
<i>Lambis scorpius</i> (Linnaeus, 1758)													+	
Tegulidae														
<i>Tectus pyramis</i> (Born, 1778)				+										
Turbinidae														
<i>Monodonta labio</i> (Linnaeus, 1758)	+			+										
<i>Turbo bruneus</i> (Röding, 1798)		+	+	+		+								+
<i>Turbo setosus</i> Gmelin, 1791						+								
Turbo spp.						+								
Triphoridae														
<i>Costatophora iniqua</i> (Jousseaume, 1898)				+										
<i>Mastonia cf. undata</i> Kosuge, 1962											+			
<i>Mastonia</i> sp.											+	+		
<i>Triphoris</i> spp.				+							+	+		
<i>Viriola intergranosa</i> (Hervier, 1898)														+
Trochidae														
<i>Clanculus cf. denticulatus</i> (Gray, 1826)						+								
<i>Clanculus margaritarius</i> (Philippi, 1846)												+		
<i>Clanculus microdon</i> A. Adams, 1853			+											
<i>Clanculus</i> sp.														+
<i>Herpetopoma gemmatum</i> (Gould, 1845)				+										
<i>Stomatolina sanguinea</i> (A. Adams, 1850)	+													
<i>Stomatolina</i> sp.				+	+									
Trochidae others		+		+		+								
<i>Trochus maculatus</i> Linnaeus, 1758				+		+								
<i>Trochus</i> sp.		+												
Octopoda														
Octopidae														
<i>Octopus</i> sp.														+
Polyplacophora														
Polyplacophora others														
Polyplacophora others		+	+	+	+	+	+			+	+			

Notes: 1: Cat Ba, 2: Ha Long, 3: Long Châu, 4: Co To, 5: Dao Tran, 6: Bach Long Vi, 7: Hon Me, 8: Nghe An, 9: Ha Tinh, 10: Quang Binh, 11: Con Co, 12: Hai Van – Son Cha, 13: Cu Lao Cham, 14: Ly Son.